3. Subbasin Assessment – Pollutant Source Inventory and Allocations Analysis

Nonpoint sources of pollution including agriculture, forestry, natural and urban stormwater account for the majority of the pollutants in the Weiser River Watershed. Point sources of pollution that may require additional analyses are the animal feeding operations in the watershed that are located in proximity to water bodies requiring TMDLs for bacteria and, possibly, total phosphorus allocations.

3.1 Sources of Pollutants of Concern

The pollutants of concern discussed in previous sections can be associated with a variety of nonpoint and point pollution sources. Wastewater treatment plants, animal feeding operations, and other facilities that discharge waste streams to receiving waters can contribute total phosphorus, bacteria, thermal loads, and, to a certain extent, suspended solids. Most identified point sources are regulated and have limitations on the amount of pollutants they are allowed to discharge. Unidentified point sources may contribute pollutants in quantities that contribute to loading that impairs beneficial uses.

Nonpoint source contributions to the pollutants of concern can vary depending on the type of activity affecting the water body. Tail water runoff from surface irrigated agriculture can contribute nutrients, sediment, bacteria, pesticides, and increased water temperature. Storm water runoff in urban settings may contribute similar pollutants. Runoff from rangelands may accelerate contributions of sediment, bacteria, and nutrients. Natural nonpoint sources, such as landslides and erosion caused by catastrophic weather-related events, could also be significant pollutant contributors.

Point Sources

The two NPDES permitted facilities in the Weiser River Watershed appear to be minor contributors to the overall loads. The high capitol cost of reducing the pollutants of concern originating from these NPDES facilities would not be cost effective at this time.

Animal feeding operations could also be regulated under a general NPDES permit. These permits specify no discharge except under extreme climatic conditions. Under the current administration by the Idaho Department of Agriculture and EPA, these facilities may or may not be required by federal or state regulations to obtain a general NPDES permit.

Nonpoint Sources

Nonpoint sources are discharges to water bodies from diffuse sources; as opposed to point sources that discharge from a discrete conveyance. Nonpoint sources are usually associated with land use and climatic events.

Temperature

A variety of natural factors can affect water temperature. These natural factors include topographic shading, upland vegetation, precipitation, air temperature, wind speed, solar angle, cloud cover, relative humidity, phreatic ground water temperature and discharge, and tributary temperature and flow (Poole and Berman 2000). When the influence of anthropogenic sources alters the ecological factors and other physical characteristics of a water body, an out-of-balance heat exchange can occur.

Thermal loading can be associated with many sources: solar radiation, ambient air temperature, inflows from tributaries and upstream sources, background radiation, convection, conduction, evaporation, wind, and the physical attributes of the water body such as width-depth ratio, pool depth and frequency, substrate meandering patterns, aspect, gradient, and discharge. Warm water from above Galloway Dam is having an impact on water temperatures downstream. During the critical period (summer months), water temperatures upstream of Galloway Dam exceed the WQS criteria for the protection of cold water aquatic life.

The physical factors affecting the Weiser River may include removal of adequate stream cover (riparian vegetation), upland vegetation changes (ground water infiltration), and stream morphology changes such as increased width-depth ratio or lack of floodplain access. In addition to physical factors, climatic factors, such as snowmelt, ambient air temperature, and precipitation, should also be considered. During the years 2000 and 2001, precipitation in the Weiser River Watershed was below normal, both in yearly snow pack and summer precipitation. These climatic conditions can alter the amount of flow, which will affect water temperature (Poole and Berman 2000).

Solar radiation is the direct impact of solar energy on water. Riparian vegetation, stream morphology, and surrounding topography affect the amount of solar radiation that reaches the water surface. Reducing shading or stream cover has been shown to increase the water temperature (Teti 1998). Brown (1970) showed solar radiation on water surfaces was the greatest factor in high water temperature during critical summer periods. The surface area and depth of a water body are also variables that affect the impact of solar radiation on water temperature. A wide, shallow stream allows for more surface area to be affected by solar radiation (width-depth ratio).

Lack of adequate stream cover (canopy) can affect the heat transfer from water to air. Stream cover provides a buffering capability for the interaction between the water surface and the ambient air by reducing wind speed over the water surface. It can also affect the relative humidity near the water surface, which also affects the rate of heat transfer. Water evaporation rates increase when there is greater wind speed and solar radiation, which, in turn, reduces the amount of water within the stream channel.

Since most of the lower Weiser River channel has been modified for flood control, another factor to be considered is the effect on the hyporheic flow condition (below streambed flow). The hyporheic flow relies on the ability of streams to form pools and riffles as well as the near benthic area of the stream to cool water for surface flow. As water enters a pool or a meander, gravity forces water into the ground and ground water continues to flow downstream until it re-enters the stream at a lower elevation. As the ground water passes through alluvial soils, it is cooled to the ambient soil temperature, thereby lowering the water temperature (Wroblicky et al. 1996; Stanford, Ward, and Ellis 1994). The lack of an adequate floodplain, side channels, and backwaters are also critical influences for hyporheic flows and water temperature (Poole and Berman 2000).

The Corps of Engineers constructed levees to prevent flooding in the lower Weiser River. In addition to preventing the river from accessing its historic floodplain, the Corps of Engineers prohibits the growth of trees greater than 6 inches in diameter on or in the immediate vicinity of the levees. This policy essentially removes any potential shading of the river in these areas. See Appendix D for further information.

Sediment

Sediment sources in the Weiser River and Crane Creek Watersheds can include stream bank erosion, overland flow, wind blown deposition, and instream channel transport. There is little information on any of the potential sediment sources that can provide a quantitative estimate of the delivery rate to streams and show that sediment is impairing the existing uses. However, studies have shown a direct impairment of aquatic biota communities from excessive sediment (Strand and Merritt 1999).

Overland flow usually consists of gully erosion, mass wasting, and general surface erosion. Since a certain amount of overland flow sediment is retained in hillside storage, the exact delivery rate of sediment from this source is difficult to determine.

One factor in determining erosion is the K factor, the measure of soil erodability as affected by intrinsic soil properties (National Sedimentation Laboratory 2002). Along with other factors such as slope, slope length, cover, and erosivity of the climate, a determination of average annual soil loss can be made in terms of tons/acre/year. Table 3 describes the geology, soil types, and K factors found in the Weiser River Watershed.

Slope of the land and other variables, such as precipitation, wind erosion, the erosion potential of soils, and other natural factors, can also affect overland erosion. In the case of the Weiser River, slope may be a critical factor in overland erosion in rangeland areas where natural vegetation has been altered.

Smaller subwatersheds (first and second order streams) provide some sediment load to larger streams that are listed for sediment as a pollutant of concern. However, since many of these smaller watersheds only provide sediment input during snowmelt and storm events, it is very difficult to determine sediment loads from these subwatersheds.

Smaller watersheds with irrigated agriculture could be contributing sediment during the irrigation season through irrigation induced erosion. Runoff from similar practices in urban settings may have the same effects.

Since high sediment loads occur during the high discharge period, the land uses most susceptible to overland runoff should be considered significant contributors. These areas include barren croplands, dryland agriculture areas, winter feeding areas, river/stream banks, roads, mining areas, and rangelands. River/stream bank erosion is a source of sediment, especially during periods of high discharge. Clark (1985) identified a segment of the Weiser River, below Galloway Dam, as a contributor of approximately 29,000 tons of sediment per year to the Snake River.

A critical part of the implementation plan will be to determine sediment yield from all sources and address the high priority areas of concern. Development of export coefficients will assist in addressing high priority areas.

Bacteria

Bacteria can originate from a variety of sources. These sources can include direct contribution by warm-blooded animals, irrigation induced runoff from pastures, irrigation induced runoff from land application sites, gray water from unapproved residential disposal systems, faulty septic systems, and recreational activities. It will be a critical part of the implementation plan to identify bacteria sources and address the high priority areas of concern. In the Crane Creek subwatershed, the source for bacteria appears to be below the reservoir since the bacteria counts from the reservoir itself are low. Irrigated pastureland is one of the largest land uses in the Little Weiser River corridor; however, the source of excessive bacteria is not known at this time.

Nutrients (Total Phosphorus)

Phosphorus can be found in most soils and in a variety of chemical states. Some phosphorus is readily available for plant uptake, while other forms may require a chemical or biological interface to become available. The fertilizers applied on cultivated fields (ortho-phosphate) are in a form readily available for plant uptake. Animal waste also contains high amounts of biologically available phosphorus. Phosphorus that is chemically bound to sediments is not necessarily readily available for plant uptake, but through a biological, chemical, or physical reaction, it can become available.

Data are presented in Section 3.2 that show some areas of concern for the total phosphorus load in the Weiser River. Areas, or sources, of concern vary during different discharge conditions. During high discharge periods from May through mid-June, a majority of the total phosphorus load is associated with upstream sources, above the Crane Creek and Mann Creek Watersheds. During low discharge periods, Crane Creek appears to be a significant source of total phosphorus to the Weiser River, while the river upstream acts as a sink for phosphorus originating from upstream. Below Galloway Dam, the Lower Payette Ditch, Monroe Creek, and irrigation return drains appear to be significant sources of total phosphorus.

Land uses for the fifth field HUCs identified as tributaries contributing pollutant loads or areas adjacent to impaired water bodies are presented in Table 76. Figure 64 shows land uses in the fifth field HUCs for the critical reaches not supporting beneficial uses or providing significant contributions to downstream loads.

Table 76. Nonpoint Source Assessment, Land Use. Weiser River Watershed.

Fifth Field HUCa	Dryland (acres)	Gravity Irrigated (acres)	Sprinkler Irrigated (acres)	Rangeland (acres)	Forest (acres)	Urban (acres)	Open Water (acres)
Monroe-Mann		5,789	1,741	20,587		580	41
Weiser Cove	174	5,873	2,826	58,034			
Sage		483		20,537	500		
Lower Crane		1,000	903	30,263			1
Keithly	248	6,744	2,702	34,629		1	
Pine		5,262	257	25,488	3,005		
Crane Creek Reservoir	47	222	2,996	49,246			1,507
Big Flats		1,676	71	42,010			
Soulen	198	697	752	29,403			
Cove Creek	1,600	130	285				
Little Weiser		7,368	365	39,868			221
Total	2,267	35,244	12,898	350,065	3,505	581	1,770

a Acres calculated for fifth field hydrologic units (HUCs) having direct impact on receiving waters; areas above dams omitted except for Crane Creek.

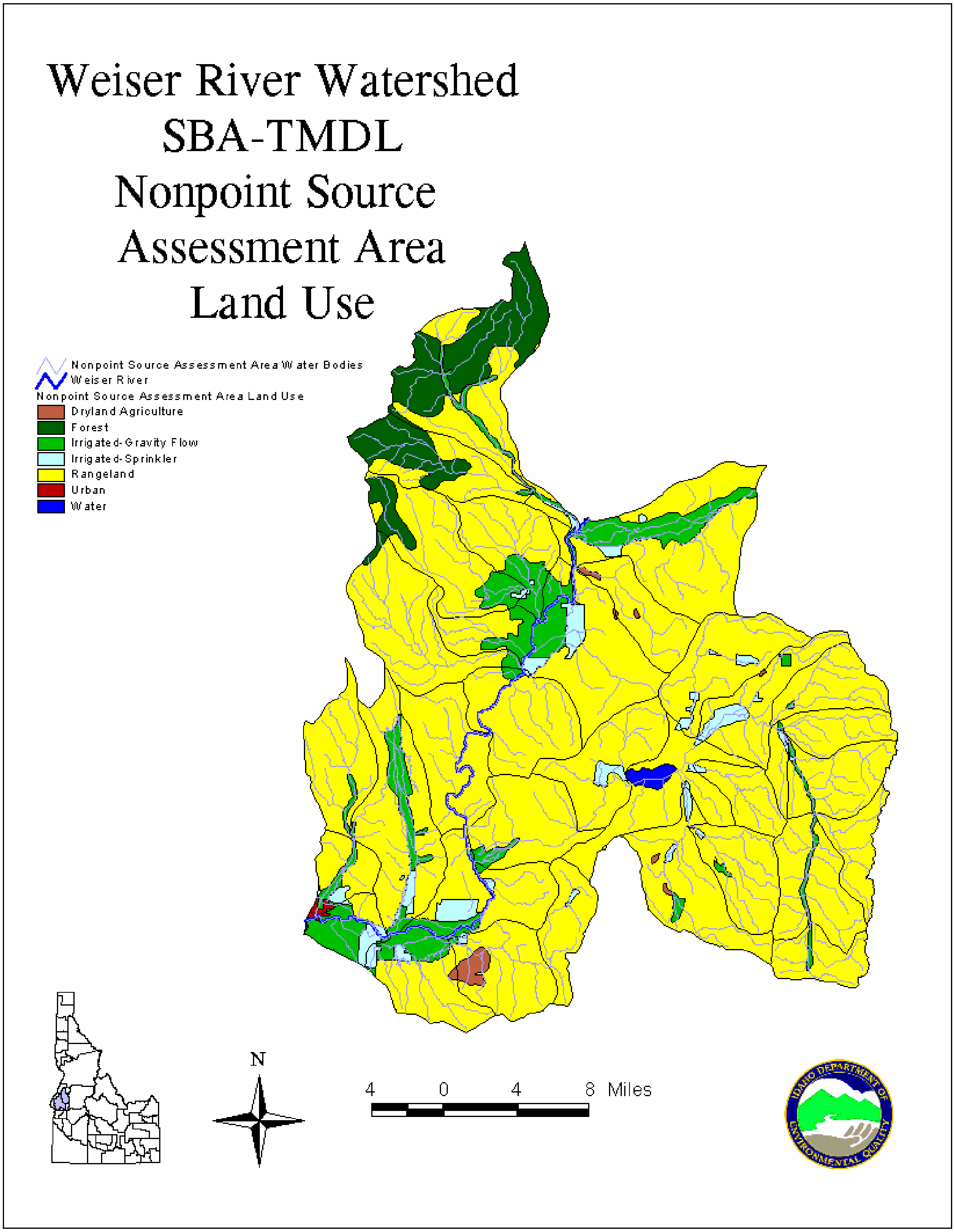

Figure 64. Nonpoint Source Assessment Area Land Use. Weiser River Watershed.

Pollutant Transport

Currently, information is unavailable to determine pollutant export (mainly nutrients and sediment) from the different land uses. Literature values could be applied to determine appropriate export coefficient values. Verification of these values would be a time-consuming and expensive undertaking.

Bacteria loads originate from animal and human waste. The monitoring conducted in the years 2000 through 2002 showed the majority of the bacteria contribution originates below Galloway Dam. Idaho Department of Agriculture data that was collected from 2000 through 2003 showed Mann Creek as a significant source of bacteria. Since the critical time period for bacteria levels is during low flow, it would appear that inflows below Galloway Dam are providing a majority of the bacteria loads. It does not appear that any other pollutants, such as sediment, can be associated with bacteria loads.

High total phosphorus load transport usually occurs during high flows and is usually associated with sediment. This assumption is not necessarily true in the Weiser River Watershed. For example, the total phosphorus and TSS concentration data collected during the years 2000 through 2003 for Mann Creek showed no correlation between TSS and total phosphorus. Approximately 82% of the total phosphorus is in the form of ortho-phosphate, which is usually dissolved within the water column. An average of 43% of the total phosphorus is dissolved ortho-phosphate in the Weiser River at Highway 95 (2000-2001). A regression analysis on total phosphorus and TSS concentrations resulted in an r^2 of -0.57. In Crane Creek, one of the larger contributors of total phosphorus during the low discharge period, 83% of the total phosphorus is in the form of ortho-phosphate. Regression analysis showed an r^2 value of 0.13. Additional seasonal analysis is required to gain a better understanding of total phosphorus transport in the water column.

Warm water from above Galloway Dam is having an impact on water temperature downstream. During the critical period (summer months), water temperatures upstream of Galloway Dam exceed the WQS criteria for the protection of cold water aquatic life. At the USGS gage station located 5 miles upstream of Galloway Dam, the average daily temperature was 21.5 ^oC and the maximum daily average temperature was 24.3 ^oC during July and August 2001. The daily average temperature increased to 23.5 ^oC, and the maximum daily average temperature was 26.6 ^oC downstream in the Weiser River at Highway 95.

3.2 Total Phosphorus Allocations

Point Sources

The only point sources in the Weiser River Watershed are the Cambridge and Council WWTPs. Neither facility requires a waste load allocation at this time. Further discussion of point sources will follow.

Lower Weiser River

Water Quality Data Analysis

Figures 65 and 66 show the total phosphorus concentration results for the Weiser River at the Highway 95 Bridge at Weiser, Idaho. This site is approximately 0.5 mile upstream from the confluence with the Snake River. Monitoring conducted by the Bureau of Reclamation from the years 1987 through 1989 and DEQ from the years 2000 through 2001 (Ingham 2000) are the only data available from this location. The data presented in Figures 65 and 66 and Appendix C may not reflect the final concentration as the Weiser River discharges into the Snake River since the monitoring location is upstream of Monroe Creek. The estimated loading and discharge to the Snake River from the Weiser River is presented in Tables 77 and 78. The estimated discharge takes into account Monroe Creek, which enters the Weiser River below the historic river monitoring site at the Highway 95 Bridge. Table 79 presents data collected from May through September, the critical period of the year for total phosphorus levels.

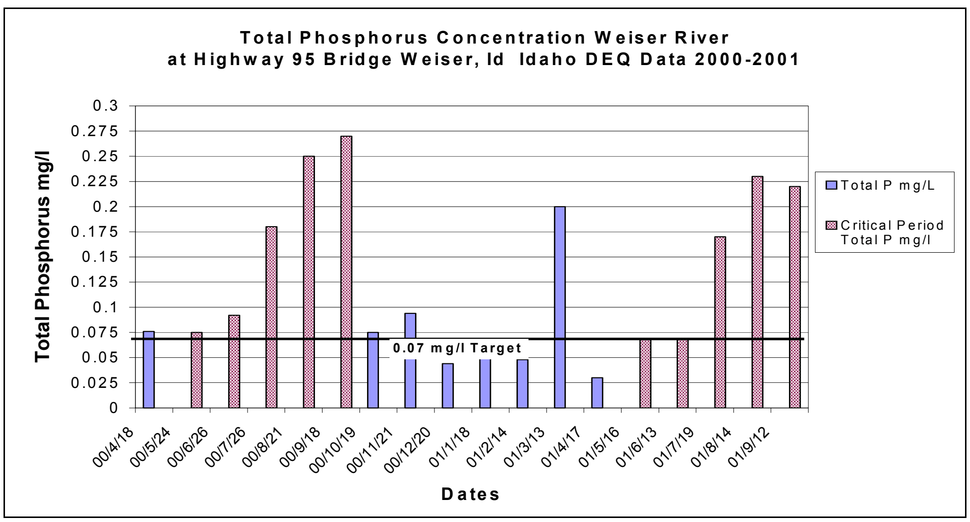

Figure 65. Total Phosphorus Concentrations, Weiser River at Highway 95 Bridge at Weiser, Idaho. DEQ Data 2000-2001. Weiser River, Galloway Dam to the Snake River.

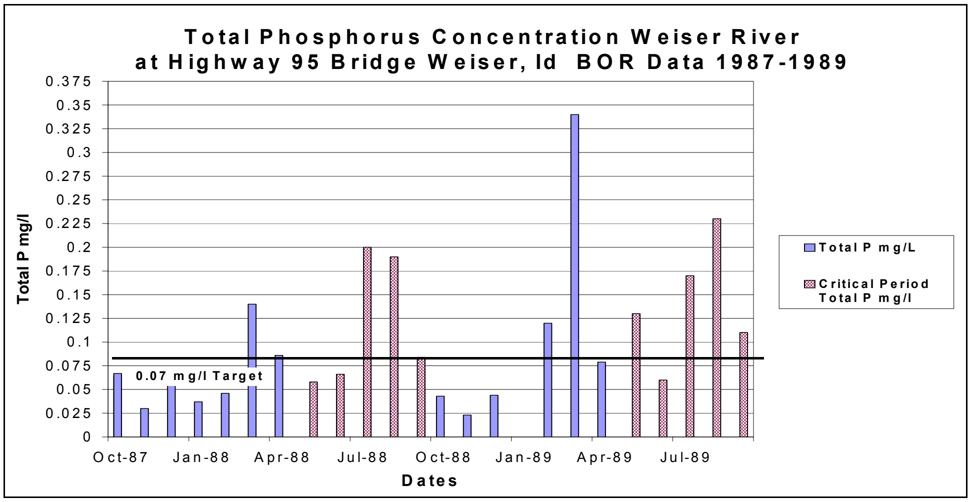

Figure 66. Total Phosphorus Concentrations, Weiser River at Highway 95 Bridge at Weiser, Idaho. BOR Data 1987-1989. Weiser River, Galloway Dam to the Snake River.

Table 77. Measured and Estimated Flows to the Snake River from the Weiser River Watershed and Measured Total Phosphorus Concentrations. Bureau of Reclamation 1987-1989. Weiser River, Galloway Dam to the Snake River.

Months	Actual Measured Flows BOR[a] 1987-1988 (cfs)[b]	Estimated Flow Discharge to Snake River BOR 1987-1988 (cfs)	Total Phosphorus Concentration BOR 1987-1988 (mg/L)[c]	Actual Measured Flows BOR 1988-1989 (cfs)	Estimated Flows Discharge to Snake River BOR 1988-1989 (cfs)	Total Phosphorus Concentration BOR 1988-1989 (mg/L)
Oct[d]	162	163	0.066	50	51	0.043
Nov	80	81	0.030	97	98	0.023
Dec	188	189	0.055	48	49	0.044
Jan	549	552	0.037	ND[e]	ND	ND
Feb	997	1,004	0.046	3,222	3,229	0.120
Mar	1,121	1,149	0.140	6,577	6,604	0.340
Apr	801	839	0.086	2,245	2,243	0.079
May[f]	556	599	0.058	3,525	3,568	0.130
Jun[f]	645	670	0.066	955	980	0.060
Jul[f]	128	154	0.200	227	253	0.170
Aug[f]	132	140	0.190	224	232	0.230
Sep[f]	56	65	0.043	98	107	0.110

a Bureau of Reclamation
b cubic feet per second
c milligrams per liter
d average of two samples collected as duplicates
e no data
f shaded represents critical period

Table 78. Measured and Estimated Flows to the Snake River from the Weiser River Watershed, Idaho DEQ 2000-2001. Weiser River, Galloway Dam to the Snake River.

Months	Actual Measured Flows DEQ 1999-2000 (cfs)[a]	Estimated Flow Discharge to Snake River DEQ 1999-2000 (cfs)	Total Phosphorus Concentration DEQ 1999-2000 (mg/L)[b]	Actual Measured Flows 2000-2001 (cfs)	Estimated Flows Discharge to Snake River DEQ 2000-2001 (cfs)	Total Phosphorus Concentration DEQ 2000-2001 (mg/L)
Oct[c]	ND[d]	ND	ND	50	51	0.075
Nov	ND	ND	ND	97	98	0.094
Dec	ND	ND	ND	170	171	0.044
Jan	ND	ND	ND	140	142	0.051
Feb	ND	ND	ND	220	227	0.048
Mar	ND	ND	ND	1,760	1,788	0.200
Apr	2,601	2,639	0.076	718	756	0.030
May[e]	2,470	2,513	0.075	1,370	1,413	0.068
Jun[e]	1,382	1,407	0.092	377	402	0.069
Jul[e]	205	231	0.180	256	282	0.170
Aug[e]	55	63	0.250	237	245	0.230
Sep[e]	57	66	0.270	141	150	0.220

a cubic feet per second
b milligrams per liter
c average of two samples collected as duplicate
d no data
e shaded represents critical period

Table 79. Critical Period (May-September) Statistical Results for Total Phosphorus Concentrations. Weiser River at Highway 95 Bridge, Weiser ID. Weiser River, Galloway Dam to the Snake River.

Weiser River at Highway 95 Bridge 1987-1989 BOR Data (May-September)	Total Phosphorus Concentrations (mg/L)[a]
Average	0.130
Standard Deviation	0.064
Maximum	0.230
Minimum	0.058
Weiser River at Highway 95 Bridge 1999-2001 DEQ Data (May-September)	**Total Phosphorus Concentrations (mg/L)**
Average	0.162
Standard Deviation	0.080
Maximum	0.270
Minimum	0.068

a milligrams per liter

Normalized Discharge Data Analysis

An attempt was made to normalize river discharge data. However, to normalize discharge data, a reliable historic discharge recording station was needed. The nearest continuous recording station for the Weiser River is located approximately 12 miles upstream of the confluence with the Snake River (USGS Gage No.1326600). Unfortunately, this site is upstream of two major irrigation water diversions (outflows) and numerous tributaries and irrigation return drains (inflows). Therefore, historic discharge data recorded at this site would not be representative of discharges to the Snake River, especially during periods when irrigation water withdrawals and irrigation water returns are occurring. To compensate for the expected difference in discharge levels from the USGS site 12 miles upstream, a water budget including withdrawals and inflow from the USGS gage to the Snake River was developed.

With the use of USGS historic data for irrigation water withdrawals for the Sunnyside Canal (USGS Gage No. 16265000) and the Galloway Canal (USGS Gage No. 16266500), an estimate of a total phosphorus budget can be calculated for the Weiser River at Galloway Dam. From Galloway Dam to the confluence with the Snake River, three major tributaries—Mann Creek, Cove Creek, and Monroe Creek—discharge to the Weiser River. In addition to these tributaries, five irrigation water return drains—Smith Drain, Frazier Drain, Unity Drain, Sunnyside Canal Drain, and Payette Ditch—discharge to the Weiser River. None of the tributaries or irrigation water return drains are current discharge monitoring sites. Data from past water quality evaluations and historic USGS discharge information was utilized to determine a mass balance for inflow and outflow. This approach offers a means to determine discharge and total phosphorus loading analysis from the Weiser River Watershed to the Snake River, even with the unpredictable discharges in the Weiser River Watershed.

Many variables will affect real-time discharges and the associated total phosphorus loads in the watershed. Irrigation water diversions are numerous, and in most years, the available water in the river is insufficient to supply existing water rights from the middle and lower Weiser River. Supplemental water is provided by Crane Creek Reservoir during the months of July, August, and September to fulfill those water rights.

Irrigation tail water return and tributary inflows have the greatest influence on the lower Weiser River discharges and total phosphorus loads and concentrations during the critical, low-discharge period from July through September. This discharge period also represents a part of the critical period of May through September established in the *Snake River-Hells Canyon SBA-TMDL* (Idaho DEQ and Oregon DEQ 2004). These sources, located below the Galloway Dam, can contribute up to 80% of the total discharge to the Snake River. Cropping patterns from year to year affect irrigation water return and diversions. Small grains do not usually require water past July, while other crops, such as sugar beets, may require irrigation water late into the season. The use of a normalized discharge and mass balance analysis should be representative of discharge and total phosphorus loads to the Snake River.

The current USGS gage site (13266000), located 12 miles upstream of the confluence with the Snake River, provides over 60 years of data, with continuous discharge data from 1952 through the present. The USGS has also conducted water quality monitoring at this site, which provides total phosphorus load information. This site also includes data when releases from Crane Creek Reservoir have the greatest effect on discharge and total phosphorus loads to the Weiser River. Historic USGS data for the two major diversions, Sunnyside Canal (13265000) and Galloway Canal (13266500), provide an overall withdrawal rate from the river during the critical period. Studies conducted by DEQ, BOR, the Idaho Department of Agriculture, and EPA provide short-term studies of discharges and total phosphorus loading back to the river. Data sources used to determine the mass balance and the normalized discharge are located in Appendix C. Sources of water quality data are also shown in Appendix C.

Current Total Phosphorus Load Analysis

The first step taken to conduct the load analysis was to calculate the nutrient load based on the flows and nutrient concentrations recorded for the date that samples were collected. There was a high standard deviation compared to the mean, so the data were transformed to establish a natural log set of data. The natural log data were then analyzed, and a regression analysis was performed. The final results of the regression analysis are discussed in Appendix C.

Table 80 shows the results of the regression analysis on a monthly basis. This approach is taken to help identify critical sources and monthly variability of total phosphorus loads. As an example, source analysis showed the total phosphorus load above Galloway Dam accounted for 88.5% of the load in the month of May and 51.2% of the load in the month of September.

Table 80. Mass Balance for Discharge and Total Phosphorus Loads and Concentrations to the Snake River from the Lower Weiser River. Weiser River, Galloway Dam to the Snake River.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
May	2,537	609	0.098
June	1,412	372	0.110
July	241	86.4	0.155
August	66.1	30.6	0.191
September	53.2	25.7	0.199
Analysis[d]			
Average	863	225	0.150
Standard Deviation	1,010	236	0.042
Maximum	2,667	631	0.211
Minimum	37.0	19.1	0.097
Count[e]	153	153	153

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table
e estimated discharge, load, and concentration based on regression analysis of dates of instream monitoring (BOR 1987-89 and DEQ 1999-2001)

Total Phosphorus Load Allocations

The target of 0.07 mg/L is applied using the normalized discharge data and load analysis. A total phosphorus load allocation is calculated when the target value and normalized discharge data are applied. Table 81 presents the load allocations on a monthly basis. Load allocations are assigned to upstream sources to achieve the allocation in the Snake River. Table 82 presents current total phosphorus loading, allocation, load reduction, and percent reduction required to meet the allocation target.

Table 81. Discharge and Total Phosphorus Load Allocation and Concentrations to the Snake River from the Lower Weiser River. Weiser River, Galloway Dam to the Snake River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Allocation (kg/day)[b]	Total Phosphorus Concentration Target (mg/L)[c]
May			
Total Allocation	2,537	435	0.07
Above Galloway Dam		401	0.07
Below Galloway Dam		33.7	0.07
June			
Total Allocation	1,441	242	0.07
Above Galloway Dam		227	0.07
Below Galloway Dam		14.1	0.07
July			
Total Allocation	241	41.2	0.07
Above Galloway Dam		29.6	0.07
Below Galloway Dam		11.9	0.07
August			
Total Allocation	66.1	11.3	0.07
Above Galloway Dam		4.8	0.07
Below Galloway Dam		6.5	0.07
September			
Total Allocation	53.7	9.1	0.07
Above Galloway Dam		4.8	0.07
Below Galloway Dam		4.3	0.07

a cubic feet per second
b kilograms per day
c milligrams per liter

Table 82. Discharge and Total Phosphorus Load Allocation, Concentrations, Load Reductions, and Load Reduction Percentage to the Snake River from the Lower Weiser River. Weiser River, Galloway Dam to the Snake River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Current (kg/day)[b]	Total Phosphorus Load Allocation (kg/day)	Total Phosphorus Load Reduction (kg/day)	Percent Reduction Required (%)
May					
Total Allocation	2,537	587	435	152	25.9%
Above Galloway Dam		520	401	119	22.9%
Below Galloway Dam		67.2	33.7	33.5	49.9%
June					
Total Allocation	1,441	361	242	119	33.0%
Above Galloway Dam		326	227	98.2	30.2%
Below Galloway Dam		35.4	14.1	21.3	60.2%
July					
Total Allocation	241	84.5	41.2	43.3	51.2%
Above Galloway Dam		60.0	29.6	30.4	50.6%
Below Galloway Dam		24.5	11.9	12.6	51.4%
August					
Total Allocation	66.1	30.8	11.3	19.5	63.3%
Above Galloway Dam		14.4	4.8	9.6	66.7%
Below Galloway Dam		16.4	6.5	9.9	60.4%
September					
Total Allocation	53.7	29.7	9.1	20.6	69.4%
Above Galloway Dam		15.2	4.8	10.4	68.4%
Below Galloway Dam		14.5	4.3	10.2	70.3%

a cubic feet per second
b kilograms per day

Middle Weiser River

Water Quality Data Analysis

Data collected from routine USGS monitoring during the years 1996, 1997, 1999 and 2000 and DEQ monitoring during the years 2000 and 2001 (Ingham 2000) are presented in Table 83 for the critical period. The data presented in Table 83 represent total phosphorus conditions and loads at the USGS gage site. Loading to the lower Weiser River may vary due to irrigation water withdrawals from the Sunnyside and Galloway Canals.

Table 83. Total Phosphorus Concentrations, Discharge, and Total Phosphorus Load, USGS Gage No. 13266000. USGS Data 1996-1998 and 2000, DEQ Data 2000-2001. Weiser River, Little Weiser River to Galloway Dam.

	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
Average	1,010	392	0.142
Standard Deviation	1,529	946	0.072
Maximum	7,340	4,848	0.270
Minimum	141	36.9	0.024
Count	28	28	28

a cubic feet per second
b kilograms per day
c milligrams per liter

As with total phosphorus loads calculated for the lower Weiser River, normalized discharge should also be calculated from the USGS gage site. The normalization of the discharge will assist in establishing total phosphorus loads and concentrations based on average daily discharges. Appendix C provides additional discussion of statistical analysis of discharge and total phosphorus loading analysis. Table 84 presents the normalized discharge, total phosphorus load, and concentrations at the USGS gage site 13266000. Table 85 presents estimated discharge, total phosphorus load, and concentrations at Galloway Dam.

Table 84. Mass Balance for Discharge and Total Phosphorus Loads and Concentrations at USGS Gage Site (13266000). Weiser River, Little Weiser River to Galloway Dam.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
May	2,547	556	0.089
June	1,550	370	0.099
July	387	121	0.130
August	227	79.2	0.143
September	180	65.9	0.149
Analysis[d]			
Average	980	238	0.122
Standard Deviation	963	199	0.024
Maximum	2,677	579	0.152
Minimum	164	61	0.088
Count[e]	153	153	153

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table
e estimated discharge, load, and concentration based on regression analysis of dates of instream monitoring (USGS 1997-99 and 2000 and DEQ 1999-2001)

Table 85. Mass Balance for Discharge and Total Phosphorus Loads and Concentrations at Galloway Dam. Weiser River, Little Weiser River to Galloway Dam.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
May	2,340	520	0.091
June	1,328	326	0.103
July	171	60.0	0.163
August	28.0	14.4	0.226
September	29.0	14.8	0.217
Analysis[d]			
Average	864	218	0.147
Standard Deviation	1,009	229	0.042
Maximum	2,667	611	0.208
Minimum	37.0	18.8	0.094
Count[e]	153	153	153

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table
e estimated discharge, load, and concentration based on regression analysis of dates of instream monitoring (USGS 1997-99 and 2000 and DEQ 1999-2001)

Total Phosphorus Load Allocations

The target of 0.07 mg/L is applied using the normalized discharge data and load analysis. A total phosphorus load allocation is calculated when the target value and normalized discharge data are applied. Table 86 presents the load allocations on a monthly basis. Load allocations are assigned to upstream sources and Crane Creek to achieve the allocation in the middle Weiser River at Galloway Dam. Table 87 shows the reductions required to meet the allocations.

Table 86. Discharge and Total Phosphorus Load Allocation and Concentrations at Galloway Dam. Middle Weiser River. Weiser River, Little Weiser River to Galloway Dam.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Allocation (kg/day)[b]	Total Phosphorus Concentration Target (mg/L)[c]
May			
Total Allocation	2,340	401	0.07
Crane Creek		6.4	0.07
Removed by Diversions		35.4	0.07
Upstream Sources		430	0.07
June			
Total Allocation	1,328	227	0.07
Crane Creek		3.8	0.07
Removed by Diversions		38.0	
Upstream Sources		262	
July			
Total Allocation	171	29.3	0.07
Crane Creek		17.0	0.07
Removed by Diversions		37.2	
Upstream Sources		49.5	
August			
Total Allocation	28.0	4.8	0.07
Crane Creek		23.9	0.07
Removed by Diversions		34.1	
Upstream Sources		15.0	0.07
September			
Total Allocation	29.0	4.9	0.07
Crane Creek		12.5	0.07
Removed by Diversions		27.1	
Upstream Sources		18.5	0.07

a cubic feet per second
b kilograms per day
c milligrams per liter

Table 87. Discharge and Total Phosphorus Load Allocation, Concentrations, and Percent Reduction for the Lower Weiser River. Weiser River, Galloway Dam to the Snake River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Current (kg/day)[b]	Total Phosphorus Load Allocation (kg/day)	Total Phosphorus Load Reduction (kg/day)	Percent Reduction Required (%)
May					
Total Allocation	2,340	541	401	140	26%
Crane Creek[c]		21.6	6.4	15.2	70%
Removed by Diversions[d]		47.8	35.4	12.4	26%
Upstream Sources		570	430	137	24%
June					
Total Allocation	1,328	333	228	106	32%
Crane Creek		14.0	3.8	10.2	73%
Removed by Diversions		57.0	38.0	19.0	33%
Upstream Sources		376	262	115	30%
July					
Total Allocation	171	54.1	29.3	24.8	46%
Crane Creek		49.3	17.0	32.3	66%
Removed by Diversions		72.1	37.2	34.9	48%
Upstream Sources		76.9	49.5	27.4	36%
August					
Total Allocation	28.0	10.2	4.8	5.4	53%
Crane Creek		66.6	23.9	42.7	64%
Removed by Diversions		72.2	34.1	38.1	53%
Upstream Sources		15.8	15.0	0.8	5%
September					
Total Allocation	29.0	10.9	3.8	7.1	65%
Crane Creek		38.1	12.5	25.6	67%
Removed by Diversions		57.5	27.1	30.4	53%
Upstream Sources		30.3	18.5	11.8	39%

a cubic feet per second
b kilograms per day
c Crane Creek allocation based on 0.07 mg/L target
d diversion allocation will be met with reductions upstream

Upper Weiser River

Water Quality Data Analysis

Data collected from routine USGS monitoring during the years 1974, 1975, 1981 and 1982 and DEQ monitoring during the years 2000 and 2001 (Ingham 2000) are presented in Table 88. The data represent the critical period established in the *Snake River-Hells Canyon SBA-TMDL* (Idaho DEQ and Oregon DEQ 2004). The data presented in Table 88 represent total phosphorus concentrations and loads at the USGS gage site (13258500).

Table 88. Total Phosphorus Concentration, Discharge, and Total Phosphorus Load. USGS (1974-1975 and 1981-1982) and DEQ Data (2000-2001). West Fork Weiser River to Little Weiser River.

	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
Average	656	186	0.054
Standard Deviation	1,186	691	0.044
Maximum	7,480	5,123	0.280
Minimum	12.0	1.2	0.010
Count	60	60	60

a cubic feet per second
b kilograms per day
c milligrams per liter

As with total phosphorus loads calculated for the lower Weiser River, normalized discharge should also be calculated for the upper Weiser River. The normalization of the discharge will assist in establishing total phosphorus loads and concentrations based on average daily discharges. Appendix C contains the results of the regression analysis based on normalized discharge. Table 89 presents the normalized concentrations, discharge, and total phosphorus load for upper Weiser River.

Further statistical analysis and comparison of measured and estimated total phosphorus concentrations and loads are presented in Appendix C. To determine total phosphorus loads during the critical period from May through September, results from the regression analysis were applied to normalized discharge for that period. The estimated total phosphorus load and estimated concentration for the critical period are presented in Table 89.

Table 89. Estimated Total Phosphorus Concentrations, Discharge, and Total Phosphorus Loads, Weiser River near Cambridge, May through September. Weiser River, West Fork Weiser River to Little Weiser River.

Month	Estimated Discharge (cfs)[a]	Estimated Total Phosphorus Load (kg/day)[b]	Estimated Total Phosphorus Concentration (mg/L)[c]
May	1704	101.0	0.024
June	892	66.9	0.032
July	193	25.6	0.059
August	83.8	15.6	0.076
September	84.8	15.7	0.076
Analysis[d]			
Average	593	45.1	0.053
Standard Deviation	653	34.8	0.022
Maximum	1,832	106.0	0.078
Minimum	78.1	14.9	0.024
Count[e]	153	153	153

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table
e estimated discharge, load, and concentration based on regression analysis of dates of instream monitoring (USGS 1974-1975 1981-1982and DEQ 1999-2001)

The analysis of total phosphorus data does not indicate that concentrations are at impairment levels or that the total phosphorus loads are a significant source for total phosphorus loads in lower segments. Additionally, a review of the complaint files at DEQ's Boise Regional Office did not locate any complaints concerning nuisance aquatic growth, slime growth, fish kills, or odor. It is recommended that no total phosphorus load allocations be developed for this segment.

Total Phosphorus Point Source

The City of Cambridge WWTP is located in the upper Weiser River Watershed. The facility is a three-cell lagoon with chlorination. The effluent limitations for the City of Cambridge are shown in Table 90.

Table 90. Monthly Monitoring Requirement for the City of Cambridge Wastewater Treatment Plant and Effluent Limitations. Weiser River, West Fork Weiser River to Little Weiser River.

Facility	pH Max (su)[a]	BOD[b] (mg/L)[c]	Suspended Solids (mg/L)	Fecal Coliform (No./100 ml)[d] (May-Sept)	Fecal Coliform (No./100 ml) (Oct-Apr)
Cambridge, Idaho Wastewater Treatment Plant	9.0	45	70	50	100

a standard units
b biochemical oxygen demand
c milligrams per liter
d number per 100 milliliters

The City of Cambridge collected additional data for nutrients during the years 2001 and 2002. Although this increased monitoring was requested by DEQ, it was not a requirement of the NPDES permit. Table 91 shows the results of the monitoring conducted by the City of Cambridge on the effluent from the city's WWTP.

Table 91. Water Quality Monitoring Results for the City of Cambridge Wastewater Treatment Plant Effluent. Weiser River, West Fork Weiser River to Little Weiser River.

Date	Ortho Phosphorus Concentration (mg/L)[a]	Total Phosphorus Concentration (mg/L)	Discharge (mgd)[b]	Ortho Phosphorus Load (kg/day)[c]	Total Phosphorus Load (kg/day)
Mar 2001	1.60	1.78	0.1170	0.69	0.77
Apr 2001	0.95	1.17	0.0810	0.29	0.36
May 2001	0.41	0.84	0.0463	0.07	0.15
Jul 2001	0.55	0.78	0.0410	0.08	0.14
Aug 2001	0.42	0.70	0.0255	0.05	0.07
Sep 2001	0.47	1.28	0.0266	0.04	0.07
Oct 2001	0.47	1.63	0.0382	0.07	0.19
Nov 2001	0.75	1.99	0.0743	0.21	0.46
Dec 2001	0.97	1.52	0.0857	0.31	0.65
Jan 2002	1.42	2.01	0.0880	0.47	0.50
Feb 2002	1.77	0.11	0.1130	0.75	0.86
Mar 2002	1.64	1.81	0.2480	1.54	1.70
Apr 2002	0.50	0.73	0.1332	0.25	0.37

a milligrams per liter
b million gallons per day
c kilograms per day

The data from the City of Cambridge effluent monitoring were incorporated into the Weiser River water quality data at the USGS gage site located approximately 2 miles upstream of the monitoring location (Ingham 2003). An overall load was calculated for the Weiser River below the City of Cambridge discharge. Table 92 shows the critical months' (May-September) load and expected concentrations of total phosphorus. As demonstrated in Table 92, the discharge from the Cambridge WWTP has negligible effect on the total phosphorus load or concentration in the river.

Table 92. Estimated Total Phosphorus Concentrations, Discharge, and Total Phosphorus Loads, Weiser River near Cambridge, May through September. Weiser River, West Fork Weiser River to Little Weiser River.

Month	Discharge (cfs)[a]	Above WWTP[b] River Total Phosphorus Load (kg/day)[c]	Above WWTP River Total Phosphorus Concentration (mg/L)[d]	Below WWTP River Total Phosphorus Load (kg/day)	Below WWTP River Total Phosphorus Concentration (mg/L)
May	1,725	101.1	0.024	101.5	0.024
Jun	827	64.3	0.032	64.4	0.032
Jul	155	21.7	0.063	21.8	0.063
Aug	84	15.6	0.076	15.7	0.077
Sep	131	19.7	0.069	19.8	0.070
Average	584	44.6	0.053	45.0	0.053

a cubic feet per second
b wastewater treatment plant
ckilograms per day
d milligrams per liter

The City of Council's WWTP is located upstream of the City of Cambridge. The data indicate that neither facility increases total phosphorus concentrations above the recommended criteria and do not affect the downstream target. It is recommended that Segment 2835, Weiser River (West Fork Weiser River to Little Weiser River) which receives both effluents, be removed from the 303 (d) list for sediment and nutrients.

Mann Creek

Water Quality Data Analysis

Mann Creek is not listed for nutrients, and there is no indication that nutrients are impairing the designated beneficial uses. However, it is apparent that a reduction in total phosphorus will be required in the Weiser River to achieve the targets set in the *Snake River-Hells Canyon SBA-TMDL* (Idaho DEQ and Oregon DEQ 2004). Therefore, the reduction targets for the Weiser River must also to apply to its tributaries.

Most data for Mann Creek are from DEQ (Clark 1985) and the Idaho Department of Agriculture (2003). In both cases, monitoring sites were selected near the confluence with the Weiser River and the release from Mann Creek Reservoir. Data from Mann Creek at the confluence with the Weiser River provide total phosphorus concentrations and discharge measurements. The critical period for nutrient loading to the Snake River, from the months of May through September, will be used for Mann Creek. The monitoring results are presented in Table 93. Additional total phosphorus concentrations loads are located in Appendix C.

Table 93. Measured Total Phosphorus Concentrations and Loads, Mann Creek at Weiser River. DEQ 1983 and Idaho Department of Agriculture 2001-2003.

	Smoothed Discharge Data DEQ 1983 and IDA[a] 2001-2003 (cfs)[b]	Average Total Phosphorus Concentration DEQ 1983 and IDA 2001-2003 (mg/L)[c]	Average Total Phosphorus Load DEQ 1983 and IDA 2001-2003 (kg/day)[d]
May	61.9	0.193	26.9
June	18.6	0.217	9.5
July	12.8	0.354	10.7
Aug	13.1	0.211	6.6
Sep	5.5	0.180	2.7
Analysis[e]			
Average	23.1	0.229	11.5
Standard Deviation	33.3	0.119	15.6
Maximum	131	0.770	80.2
Minimum	1.4	0.110	0.5
Count	30	30	30

a Idaho Department of Agriculture
b cubic feet per second
c milligrams per liter
d kilograms per day
e analysis on all critical period data (May-September), not on data presented in table

Additional data are available upstream at the Mann Creek Reservoir Dam, including discharge data from a historic USGS gage site (13267050). These data were analyzed in the same manner as the data from the confluence with the Weiser River. The results indicate an overall increase in total phosphorus concentration by 320% and a total phosphorus load increase of 187% from the reservoir to the confluence with the Weiser River. Appendix C contains the results from monitoring conducted in the years 1975 (Tangarone and Bogue 1976), 1983 (Clark 1985), 2001 and 2002 (Idaho Department of Agriculture 2003). The values presented in Table 93 should be used to determine a load allocation for Mann Creek’s contribution to the lower Weiser River.

Total Phosphorus Load Allocations

The target of 0.07 mg/L is applied using the normalized discharge data and load analysis. A total phosphorus load allocation is calculated when the target value and normalized discharge data are applied. Table 94 presents the load allocations on a monthly basis. Load allocations are assigned to Mann Creek at the mouth to achieve the allocation at the lower Weiser River. Table 95 shows the reductions required to meet the allocations.

Table 94. Discharge and Total Phosphorus Load Allocation and Concentrations Mann Creek at Confluence with Weiser River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Allocation (kg/day)[b]	Total Phosphorus Concentration Target (mg/L)[c]
May			
Total Allocation	61.9	10.6	0.070
June			
Total Allocation	18.6	3.2	0.070
July			
Total Allocation	12.8	2.2	0.070
August			
Total Allocation	13.1	2.2	0.070
September			
Total Allocation	5.5	0.8	0.070

a cubic feet per second
b kilograms per day
c milligrams per liter

Table 95. Discharge and Total Phosphorus Load Allocation, Concentrations, and Percent Reduction for Mann Creek. Weiser River, Galloway Dam to the Snake River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Current (kg/day)[b]	Total Phosphorus Load Allocation (kg/day)	Total Phosphorus Load Reduction (kg/day)	Percent Reduction Required (%)
May					
Total Allocation	61.9	26.9	10.6	16.3	60.6%
June					
Total Allocation	18.6	9.5	3.2	6.3	66.3%
July					
Total Allocation	12.8	10.7	2.2	8.5	79.4%
August					
Total Allocation	13.1	6.6	2.2	4.4	66.7%
September					
Total Allocation	5.5	2.7	0.8	1.9	70.4%

a cubic feet per second
b kilograms per day

Other Tributaries to the Lower Weiser River

Water Quality Data Analysis

Cove Creek is listed for nutrients. Since Cove Creek is an intermittent stream, WQSs specific to this condition apply. However, since a reduction in total phosphorus is required in the Weiser River to achieve the targets set in the *Snake River-Hells Canyon SBA-TMDL* (Idaho DEQ and Oregon DEQ 2004); this reduction will also apply to its tributaries.

Most data for the lower Weiser River tributaries are from DEQ (Clark 1985) and the Idaho Department of Agriculture (2003). In both cases, monitoring sites were selected near the tributaries' confluence with the Weiser River. The critical period for nutrient loading to the Snake River, from the months of May through September, will be used for the tributaries. Current total phosphorus loads and concentrations are presented in Table 96.

Table 96. Measured Discharge and Total Phosphorus Concentrations and Loads, Tributaries to the Lower Weiser River. DEQ 1983 and Idaho Department of Agriculture 2001-2003. Weiser River, Galloway Dam to Snake River.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
Monroe Creek			
MAY	43.0	21.6	0.205
JUN	25.0	8.0	0.130
JUL	26.0	12.1	0.190
AUG	8.3	3.6	0.176
SEP	9.0	4.2	0.190
Lower Payette Drain			
MAY	25.0	6.1	0.100
JUN	22.5	5.5	0.100
JUL	10.0	2.4	0.100
AUG	6.7	1.6	0.100
SEP	6.0	1.5	0.100
Smith Drain			
MAY	6.0	1.6	0.104
JUN	7.6	6.9	0.326
JUL	2.7	0.9	0.127
AUG	6.1	2.8	0.143
SEP	3.0	0.7	0.108
Unity Drain			
MAY	4.8	3.2	0.276
JUN	6.4	3.4	0.206
JUL	6.7	3.5	0.213
AUG	4.2	2.1	0.191
SEP	3.7	1.4	0.158
Frazier Drain			
MAY	1.6	2.5	0.627
JUN	1.0	0.9	0.386
JUL	1.7	1.2	0.291
AUG	1.4	2.2	0.630
SEP	1.1	1.5	0.529
Sunnyside Ditch			
MAY	3.0	1.6	0.193
JUN	1.6	0.8	0.224
JUL	3.5	1.2	0.132
AUG	3.4	2.2	0.263
SEP	1.7	1.1	0.257
Cove Creek			
MAY	0.8	0.6	0.327
JUN	0.5	0.4	0.314
JUL	0.4	0.3	0.304
AUG	0.6	0.4	0.281
SEP	0.9	0.7	0.310

a cubic feet per second
b kilograms per day
c milligrams per liter

Total Phosphorus Load Allocations

The target of 0.07 mg/L is applied using the normalized discharge data and load analysis. A total phosphorus load allocation is calculated when the target value and normalized discharge data are applied. Table 97 presents the load allocations on a monthly basis. Load allocations are assigned to tributaries at the mouth to achieve the allocation in the lower Weiser River. Table 98 shows current the total phosphorus load, the load reduction required to meet the allocations, and the percent load reduction required.

Table 97. Discharge and Total Phosphorus Load Allocation and Concentrations, Tributaries to Lower Weiser River. Weiser River, Galloway Dam to Snake River.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
Monroe Creek			
MAY	43.0	7.4	0.07
JUN	25.0	4.3	0.07
JUL	26.0	4.5	0.07
AUG	8.3	1.4	0.07
SEP	9.0	1.5	0.07
Lower Payette Drain			
MAY	25.0	4.3	0.07
JUN	22.5	3.9	0.07
JUL	10.0	1.7	0.07
AUG	6.7	1.1	0.07
SEP	6.0	1.0	0.07
Smith Drain			
MAY	6.0	1.0	0.07
JUN	7.6	1.3	0.07
JUL	2.7	0.5	0.07
AUG	6.1	1.0	0.07
SEP	3.0	0.5	0.07
Unity Drain			
MAY	4.8	0.8	0.07
JUN	6.4	1.1	0.07
JUL	6.7	1.2	0.07
AUG	4.2	0.7	0.07
SEP	3.7	0.6	0.07
Frazier Drain			
MAY	1.6	0.3	0.07
JUN	1.0	0.2	0.07
JUL	1.7	0.3	0.07
AUG	1.4	0.2	0.07
SEP	1.1	0.2	0.07
Sunnyside Ditch			
MAY	3.0	0.5	0.07
JUN	1.6	0.3	0.07
JUL	3.5	0.6	0.07
AUG	3.4	0.6	0.07
SEP	1.7	0.3	0.07
Cove Creek			
MAY	0.8	0.1	0.07
JUN	0.5	0.1	0.07
JUL	0.4	0.1	0.07
AUG	0.6	0.1	0.07
SEP	0.9	0.2	0.07

a cubic feet per second
b kilograms per day
c milligrams per liter

Table 98. Discharge, Current Total Phosphorus Load, Load Allocation, Reduction Required, and Percent Reduction Required, Tributaries to Lower Weiser River. Weiser River, Galloway Dam to Snake River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Current (kg/day)[b]	Total Phosphorus Load Allocation (kg/day)	Total Phosphorus Load Reduction (kg/day)	Percent Reduction Required (%)
Monroe Creek					
MAY	43.0	21.6	7.4	14.2	65.9%
JUN	25.0	8.0	4.3	3.7	46.2%
JUL	26.0	12.1	4.5	7.6	63.2%
AUG	8.3	3.6	1.4	2.2	60.2%
SEP	9.0	4.2	1.5	2.6	63.2%
Lower Payette Drain				0.0	
MAY	25.0	6.1	4.3	1.8	30.0%
JUN	22.5	5.5	3.9	1.7	30.0%
JUL	10.0	2.4	1.7	0.7	30.0%
AUG	6.7	1.6	1.1	0.5	30.0%
SEP	6.0	1.5	1.0	0.4	30.0%
Smith Drain					
MAY	6.0	1.6	1.0	0.6	37.0%
JUN	7.6	6.9	1.3	5.6	81.2%
JUL	2.7	0.9	0.5	0.5	49.2%
AUG	6.1	2.8	1.0	1.8	62.7%
SEP	3.0	0.7	0.5	0.2	28.0%
Unity Drain					
MAY	4.8	3.2	0.8	2.4	74.3%
JUN	6.4	3.4	1.1	2.3	67.9%
JUL	6.7	3.5	1.2	2.4	67.4%
AUG	4.2	2.1	0.7	1.4	65.8%
SEP	3.7	1.4	0.6	0.8	56.3%
Frazier Drain					
MAY	1.6	2.5	0.3	2.2	88.7%
JUN	1.0	0.9	0.2	0.8	81.9%
JUL	1.7	1.2	0.3	0.9	76.1%
AUG	1.4	2.2	0.2	2.0	89.3%
SEP	1.1	1.5	0.2	1.3	87.3%
Sunnyside Ditch					
MAY	3.0	1.6	0.5	1.1	68.2%
JUN	1.6	0.8	0.3	0.6	68.3%
JUL	3.5	1.2	0.6	0.6	48.2%
AUG	3.4	2.2	0.6	1.6	74.1%
SEP	1.7	1.1	0.3	0.8	73.7%
Cove Creek					
MAY	0.8	0.6	0.1	0.4	77.7%
JUN	0.5	0.4	0.1	0.3	77.7%
JUL	0.4	0.3	0.1	0.2	76.6%
AUG	0.6	0.4	0.1	0.3	75.6%
SEP	0.9	0.7	0.2	0.5	77.4%

a cubic feet per second
b kilograms per day

Crane Creek

The total phosphorus load from Crane Creek is shown in Table 86. Load allocations, reductions required, and percent reductions required are shown in Table 87.

Little Weiser River

Water Quality Data Analysis

The Little Weiser River is listed for nutrients. While nutrients do not appear to be impairing beneficial uses, it is apparent a reduction in total phosphorus will be required in the Little Weiser River to achieve the targets set in the middle Weiser River and lower Weiser River.

Most data for the Little Weiser River are from DEQ monitoring between the years 2000 and 2001 (Ingham 2000). Monitoring sites were selected near the confluence with the Weiser River. Data from the Little Weiser River at the confluence with the Weiser River provide total phosphorus concentrations and discharge measurements. The critical period for nutrient loading to the Snake River, from May through September, will be used for the Little Weiser River. The monitoring results are presented in Table 99. Additional total phosphorus concentrations and loads are located in Appendix C.

Table 99. Measured Total Phosphorus Concentrations and Loads, Little Weiser at Weiser River. DEQ 2000-2001. Little Weiser River near Confluence with Weiser River. Little Weiser River, Indian Valley to Weiser River.

	Discharge (cfs)[a]	Average Total Phosphorus Load DEQ 2000-2001 (kg/day)[b]	Average Total Phosphorus Concentration DEQ 2000-2001 (mg/L)[c]
Average[d]	65.7	13.7	0.102
Standard Deviation	107.0	21.0	0.026
Maximum	347.0	71.3	0.129
Minimum	2.3	0.4	0.049
Count	10	10	10

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table

As with total phosphorus loads calculated for the middle and lower Weiser River, normalized discharge should also be calculated from the USGS gage site (13261500) on the Little Weiser River. The normalization of the discharge will assist in establishing total phosphorus loads and concentrations based on average daily discharges. Appendix C provides additional discussion of statistical analysis of discharge and total phosphorus loading. Table 100 presents the normalized discharge, total phosphorus loads, and concentrations at the USGS gage site.

Table 100. Estimated Total Phosphorus Concentrations and Loads, Little Weiser at Weiser River. Little Weiser River, Indian Valley to Weiser River.

Month	Discharge (cfs)[a]	Total Phosphorus Load (kg/day)[b]	Total Phosphorus Concentration (mg/L)[c]
May	392.8	40.3	0.043
June	234.0	28.9	0.053
July	34.9	8.5	0.123
August	3.7	2.2	0.268
September	2.8	1.7	0.339
Analysis[d]			
Average	133.8	16.4	0.165
Standard Deviation	165.2	16.2	0.132
Maximum	585.0	51.9	0.473
Minimum	0.7	0.8	0.036
Count[e]	153	153	153

a cubic feet per second
b kilograms per day
c milligrams per liter
d analysis on all critical period data (May-September), not on data presented in table
e estimated discharge, load, and concentration based on regression analysis of dates of instream monitoring (DEQ 2000-2001)

Total Phosphorus Load Allocations

The target of 0.07 mg/L is applied using the normalized discharge data and load analysis. A total phosphorus load allocation is calculated when the target value and normalized discharge data are applied. Table 101 presents the load allocations on a monthly basis. Load allocations are assigned to the Little Weiser River at the mouth to achieve the allocation in the middle Weiser River. Table 102 shows the reductions required to meet the allocations.

Table 101. Discharge, and Total Phosphorus Load Allocations and Concentrations, Little Weiser River at Confluence with Weiser River. Little Weiser River, Indian Valley to Weiser River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Allocation (kg/day)[b]	Total Phosphorus Concentration Target (mg/L)[c]
May			
Total Allocation	392.8	67.3	0.070
June			
Total Allocation	234.0	40.1	0.070
July			
Total Allocation	34.9	6.0	0.070
August			
Total Allocation	3.7	0.6	0.070
September			
Total Allocation	2.8	0.5	0.070

a cubic feet per second
b kilograms per day
c milligrams per liter

Table 102. Discharge, Current Total Phosphorus Load, Total Phosphorus Load Allocation, Load Reduction, and Percent Reductions. Little Weiser River at Confluence with Weiser River. Little Weiser River, Indian Valley to Weiser River.

Month/Source Allocation	Discharge (cfs)[a]	Total Phosphorus Load Current (kg/day)[b]	Total Phosphorus Load Allocation (kg/day)	Total Phosphorus Load Reduction (kg/day)	Percent Reduction Required (%)
May					
Total Allocation	394.5	40.3	67.3	NRR[c]	NRR
June					
Total Allocation	234.0	28.9	40.1	NRR	NRR
July					
Total Allocation	34.9	8.5	6	2.5	29.4%
August					
Total Allocation	3.7	2.2	0.6	1.6	72.7%
September					
Total Allocation	2.8	1.7	0.5	1.2	70.6%

a cubic feet per second
b kilograms per day
c no reduction required

4. Subbasin Assessment – Summary of Past and Present Pollution Control Efforts

The Weiser River Soil Conservation District provided information on ongoing efforts to address nonpoint sources from agriculture areas. No other information was provided on the types of activities occurring and which pollutants are being addressed through these pollutant controls efforts. The following contracts are mainly federally funded projects with the local soil conservation district sponsoring the project and the NRCS providing technical assistance.

- Little Weiser River Drainage-5 contracts, total acres 2,473
- Mainstem Weiser River-19 contracts, total acres 6,449
- Crane Creek Drainage-1 contract, total acres 266

Because elevated levels of nitrates have been found in local ground water, the lower Weiser River area, including the Sunnyside area, has been designated a State Nitrate Priority Area. A ground water management plan has been developed to address nitrates in the area. With this designation as a high priority area, Idaho provides resources to local governments to address land use practices and develop pollution control measures.